09/973,778
Art Unit: 1731
Response to office action mailed 11/10/2004

Amendments to the Claims

Please amend the claims as follows. This listing of the claims will replace all prior versions, and listings of claims, in the application:

1) (currently amended) A method of ~~making~~ reducing stress-induced mechanical problems in optical quality components having a plurality of layers with different refractive indices, comprising carrying out the following steps in sequence:

a) depositing silica buffer layers respectively on a front and back face of a silicon wafer by PECVD (Plasma Enhanced Chemical Vapor Deposition) to provide a first structure resistant to wafer warp during thermal processing;

~~b)subjecting said first structure to a first thermal treatment to~~ reducinge optical absorption and compressive stress in said buffer layers by subjecting said first structure to a first thermal treatment, ;

~~c)~~b) said first thermal treatment comprising:

i) decreasing compressive stress in said buffer layers from an initial compressive value by subjecting said first structure to a temperature that ramps up from a stabilization temperature to a temperature of at least 800°C ~~to decrease compressive stress in said buffer layers from an initial compressive value~~;

ii) further decreasing compressive stress in said buffer layers and reducing optical absorption by continuing to subject said first structure to said temperature of at least 800°C for a period of at least 30 minutes ~~to further decrease compressive stress in said buffer layers and reduce optical absorption~~; and

iii) ~~ramping down said temperature to which said first structure is subjected to a final temperature such that~~ causing said first structure to undergoes an elastic deformation wherein the compressive stress in said buffer layers increases linearly to a final compressive value that is less than said initial compressive value by ramping down said temperature to which said first structure is subjected to a final temperature;

~~d)~~c) depositing a silica core layer on said buffer layer on said front face of the wafer by PECVD to form a second structure;~~and~~

~~f~~d)~~subjecting said second structure to a second thermal treatment to~~ reducinge optical absorption and tensile stress in said core layer by subjecting said second structure to a second thermal treatment,[[;]]-said second thermal treatment comprising:

i) relieving tensile stress in said core layer from an initial tensile value by subjecting said second structure to a temperature that ramps up to a temperature of at least 600°C ~~to relieve tensile stress in said core layer from an initial tensile value~~;

ii) reducing optical absorption by continuing to subject said second structure to a temperature of at least 600°C for a period of at least 30 minutes ~~to reduce optical absorption~~; and

iii) ~~ramping down said temperature to which said second structure is subjected so that~~ causing said second structure to undergoes elastic deformation and said tensile stress in said core layer to decreasees linearly to a final tensile value that is less than said initial tensile value by ramping down said temperature to which said second structure is subjected; and

e) depositing a cladding layer over said core layer.

2.(cancelled)

3.(cancelled)

4.(previously presented) A method as claimed in claim 1, wherein said first structure is maintained at said stabilization temperature for a period of from 1.3 to 130 minutes.

5.(previously presented) A method as claimed in claim 1, wherein said first structure is maintained at said stabilization temperature for a period of about 13 minutes.

6.(currently amended) A method as claimed in claim ~~3~~1, wherein in step e~~b~~(i) the temperature of said first structure is ramped up from said stabilization temperature to said temperature of at least 800°C at a rate lying in the range 1°C/min to 25°C/min.

7.(previously presented) A method as claimed in claim 6, wherein said rate is 5°C/min.

8.(previously presented) A method as claimed in claim 1, wherein said stabilization temperature lies in the range 300°C to 700°C.

9.(previously presented) A method as claimed in claim 1, wherein said stabilization temperature is about 400°C.

10.(currently amended) A method as claimed in claim 8, wherein in step e~~b~~(iii) the temperature of said first structure is ramped down to said final temperature at a rate in the range 1°C/min. to 25°C/min.

11.(previously presented) A method as claimed in claim 10, wherein said rate is 2.5°C/min.

12.(currently amended) A method as claimed in claim 1, wherein in step e~~b~~(ii) the temperature of at least 800°C to which said first structure is continued to be subjected for at least 30 minutes lies in the range of 800°C to 1,300°C.

13.(currently amended) A method as claimed in claim 1, wherein in step e~~b~~(ii) the temperature of at least 800°C to which said first structure is continued to be subjected is 900°C.

14.(previously presented) A method as claimed in claim 1, wherein said first and second thermal treatments are carried out in the presence of an inert gas.

15.(currently amended) A method as claimed in claim ~~14~~1, wherein said first and second treatments are carried out in the presence of a ~~inert~~ gas ~~is~~ selected from the group consisting of: nitrogen, oxygen, hydrogen, water vapour, argon, fluorine, carbon tetrafluoride, nitrogen trifluoride, and hydrogen peroxide.

16.(previously presented) A method as claimed in claim 14, wherein said inert gas has a constant flow rate.

17.(previously presented) A method as claimed in claim 16, wherein said flow rate of said inert gas lies in the range 1 liter/min. to 100 liters/min.

18.(currently amended) A method as claimed in claim 1, wherein in step ~~f~~d(ii) the temperature of at least 600°C to which said second structure is continued to be subjected lies in the range 600 to 1300°C.

19.(currently amended) A method as claimed in claim 18, wherein in step ~~f~~d(ii) the temperature of at least 600°C to which said second structure is continued to be subjected is 900°C.

20.(canceled)

21.(canceled)

22.(cancelled)

23.(cancelled)

24.(previously presented) A method as claimed in claim 1, wherein a protective layer is deposited on the back face of the buffer layer on the back side of the wafer and a compensating layer is deposited on the front face of the wafer.

25.(previously presented) A method as claimed in claim 24, wherein the protective layer and compensating layer are silicon nitride.

26.(cancelled)

27.(cancelled)

28. (cancelled)

29.(cancelled)

30.(cancelled)

31.(cancelled)